

Human Factors in Health Technology Throughout the Product Development Lifecycle

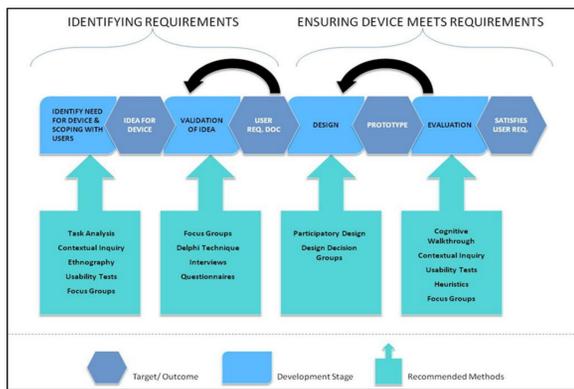


The University of
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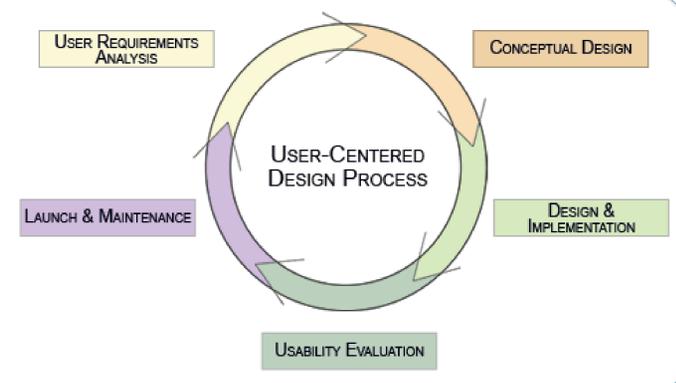
UNITED KINGDOM • CHINA • MALAYSIA

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- Our research and applied work,**
- *Uses Human Factors to understand user requirements of health technologies and medical devices.
 - *Involves users in the development of our methods and research design.
 - *Utilises user-centred and participatory approaches with users and stakeholders throughout the design and evaluation of medical and healthcare technologies.
 - *Entails the expert application of a wide range of methods at the appropriate time during a design lifecycle

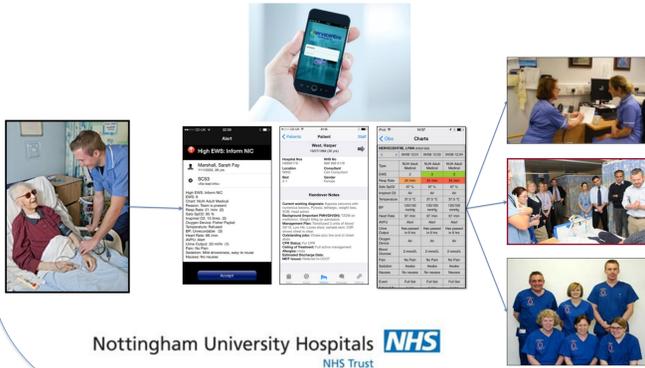


System Evaluation - Staff experience of Technology intervention, EOb and Handheld Technologies in the Ward

- Capture and evaluate the impact of technology on staff practice
- Provide guidance for future implementation of technology
- Report on staff satisfaction with change in technology and practice

- **85.9 hours** of staff observations on the Wards
- (data includes pre and post deployment observations)
- **40 staff interviews** (post deployment data)

- Results**
- Mobile tools to support clinical observation have the potential to be beneficial for doctors and nurses.
 - Deployment of this technology takes time, must involve working directly with users and must be supported by a specialist technology deployment team.
 - More junior staff adapt to the technology particularly well.
 - Clinicians find ways of using this technology in conjunction with other tools to manage their work.
 - Embedded algorithms must take account of different specialisations.
 - The technology can support clinical and patient communications.
 - It is vital that there is integration of new IT systems with existing systems.
 - Technology is only as good as the infrastructure that supports it.



Nottingham University Hospitals NHS Trust

Ref: 1)

Design, Development and Evaluation of digital games in the field of hearing aid technologies – 3D Tunein

3D Tune-In aims to understand the issues of hearing loss and facilitate the successful exploitation of existing, overlooked or neglected functionalities of hearing devices through the novel use of 3D gaming technologies. It brings together the relevant stakeholders from traditional gaming industries, academic institutions, a large hearing aid manufacturer, and hearing communities, to produce digital games in the field of hearing aid technologies and hearing loss.



Four games aimed at children or adults will provide accurate 3D sound simulations to demonstrate and provide training on the different features of digital hearing aids in everyday contexts. One game is aimed at individuals with no hearing impairment to improve understanding of how hearing loss can compromise everyday activities and how a hearing aid can improve this situation



Ref: 2)

System Evaluation - Using cognitive work analysis to explore the role of mobile technologies in the anaesthetists work practice

To provide a general understanding of the role of mobile technologies in the anaesthetists' work practice

To explore barriers towards the use of mobile techs.

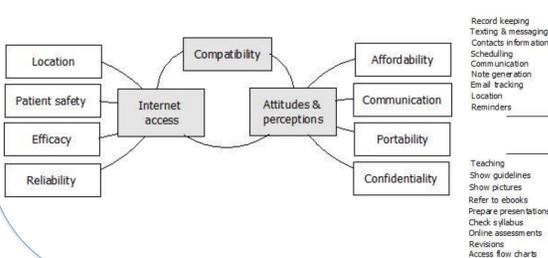
To provide complete and description of the tasks

To explore the impact of mobile techs in the work practice

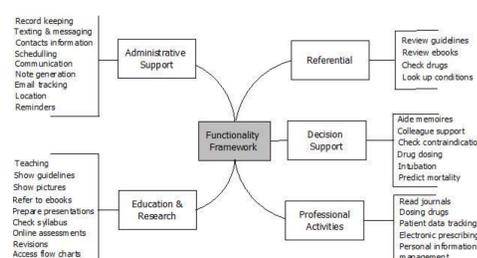
Contextual inquiry: Observe participants in order to understand the tasks, asking about what is happening, why it is happening, and how the tasks can be enhanced

Semi-structured interviews: Explore aspects related to the use of mobile technologies in different contexts and probing observation findings

Results: Main barriers for use of mobile techs



Results: Functional framework



Ref: 3)

Vision Normality from Virtual Unreality - Interactive Binocular Therapy (I-BiT™) for treatment of lazy eye (amblyopia)



Amblyopia (lazy eye) is abnormal visual development in the brain during childhood causing poor vision in one eye. It affects 2-3% of the population and leads to restrictions in employment and increased risk of blindness. Conventional treatment involves patching the "good" eye for many hours each day but has a detrimental effect on the child's ability to use their eyes together. Patching affects quality of life and poor compliance results in poor visual outcome; overall results are mediocre.



Funded by an NIHR i4i award, the novel I-BiT™ system uses VR technologies like shutter-glasses to stimulate both eyes simultaneously, but the content is displayed preferentially to the amblyopic eye. Thus the VR technology is being used to display something which intentionally does not look real. The treatment is about to be delivered in the home via specially designed computer games and a DVD player. In both cases some important visual components are only displayed to the amblyopic eye, stimulating that eye to work with the good eye. Preliminary clinical studies show very encouraging results with dramatically reduced treatment times.

Ref: 4)



horizon
CENTRE FOR DOCTORAL TRAINING

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- 2) 3D Tune-In: 3D Games for Tuning and Learning About Hearing aids By Richard Eastgate, PhD; Lorenzo Picinali; Harshada Patel, PhD; & Mirabelle D'Cruz. The hearing Journal, Feb 2016.
- 3) Velzen, J., Atkinson, S., Rowley, E., & Martin, J. L. (2015). The Tradition of Anaesthetic Rooms: Best Practice or Patient Risk?. Procedia Manufacturing, 3, 59-66.
- 4) N Herbyson, IM Ash, D MacKeith, A Vivian, JH Purdy, A Fakis, SV Cobb, T Hepburn, RM Eastgate, RM Gregson, AJE Foss (2015). Interactive stereo games to improve vision in children with amblyopia using dichoptic stimulation. IS&T/SPIE Electronic Imaging, 93910A-93910A-8

